

Work Order ID 63863

Wednesday, November 17, 2010 10:27:01 A

Page 1

Item ID: D407-667-205

Accept

Revision ID:

Item Name: Crosstube Aft

Start Date: 11/17/2010 Start Qty: 1.00

Required Date: 11/30/2010 Req'd Qty: 1.00

Cust Item ID:

Customer:

Reference:

Approvals:

Process Plan:

Date: 10-11-17

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run

Start

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D407-667-245

Rev F

100

0.00



DC

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile and create labels as per PPP D407-667-205 CHG006

5 11/10/10

Pto →

110

0.00



Packaging

Packaging

Pick Kit
Packaging

Memo

0.00

DP

10-12-14

120

0.00



CNC Bend 1

CNC Delta 100 Bender

BENDING MACHINE - CROSSTUBES


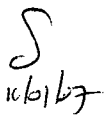
Memo

1-Bend tube as per Dwg D407-667-245 using CNC bender: program 407 Aft and Folio FT

DP

10-12-14

Dart Aerospace Ltd

W/O: 635603		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
11/01/07	#100	Perm. change Fix Routin numbers		11.01.10			

Part No: D407-667-205 PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

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Required Date: 11/30/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00



0.00

QC

Memo

Quality Control

8 10/12/14

FXU

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Reference:

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Run Start

QC: Date: SPC (Y/N): Date:

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

140

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Drill pilot holes in tube using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill all (3) top holes.

2-Drill and Ream all holes in tube to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Check dimensions between holes on all four sides.

3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

4-Drill pilot holes using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill only the top (2) holes.

5-Drill & ream the top (2) holes to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245

6-Drill Aft rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Note: Aft side has 3x top holes.

7-Drill Fwd rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Drill only the top (3) holes.

8-C'sink holes as per Dwg D407-667-245. Allow rivet to sit below surface to compensate for paint.

9- Scribe tube to identify on the inner chamfer in the cuff D# and B#

10-Deburr & Inspect for surface damage. Repair damage within limits as per

SAD

10-12-20

10-12-20

W/O:		WORK ORDER CHANGES					
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Run Start

QC: Date: SPC (Y/N): Date:

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Dwg D407-667-245

150

Crosstubes Chemical Conversion

0.00

SAY

(1)

HandFXtube

Memo

0.00

10-12-20

Hand Finishing Crosstubes

160

QC3- Inspect Part Finish

0.00

8/10/12/10

QC

Memo

0.00

Quality Control

170

QC5- Inspect part completeness to step on W/O

0.00

8/10/12/10

QC

Memo

0.00

Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180  Outsource2	Outsource process - NDT per QSI038 4.1	0.00							
	Memo	0.00							
	Liquid Penetrant Inspection as per QSI 0380 Issue P/O: <u>13181</u> LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190  Packaging	Packaging	0.00							
	Memo	0.00							
	Ensure copy of NDT results attached to work order.								
200  QC	QC5- Inspect part completeness to step on W/O	0.00							
	Memo	0.00							
	Quality Control								

C2 10/12/21 ①

10/12/21 (U)

ml 10 12 21 ①

W/O:		WORK ORDER CHANGES					
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Customer:



Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210		0.00							
	SprayPaint								
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2 PRIME: Start Time: <u>7:00</u> Fininsh Time: <u>7:30</u> PAINT: Start Time: <u>11:30</u> Finish Time: <u>12:30</u>								
220	QC14- Inspect Spray Paint	0.00							
									
QC	Memo	0.00							
Quality Control	Then,Wrap in plastic bag to protect from scratches								

ml 10 12 22 ①

FT 10-01-04

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Customer:

Reference:

Approvals: Process Plan: Date: Tooling: Date:

Run Start

QC: Date: SPC (Y/N): Date:

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

230

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

11-01-05

1-Install abrasion strips as per QSI 035 using DT8674. Install chafing shield as per Dwg D407-667-245. Note: (3) top holes should be facing up.

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3-Install support with magnobond and install clamps as per Dwg D407-667-245 using installation jig DT9025. Torque clamps to 80-100 in lb

A/R Magnobond Batch: 115580
EXP: 01/2001

4-Install nut plates as per Dwg D407-667-245. Touch-up rivet heads with Imron paint.

Accept Qty: 11 Reject Qty: 10 Reject Number: 01 Insp. Stamp: 04 (1)

240

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

8/11/10

(41)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Required Date: 11/30/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250	Pick Kit	0.00							
Packaging	Memo	0.00							
Packaging									
260	QC4- 100% Inspect kits for completeness	0.00							
QC	Memo	0.00							
Quality Control									
270	Packaging	0.00							
Packaging	Memo	0.00							
Packaging	Identify and in kanban rack Location: <u>53</u>								

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Cust Item ID:

Required Date: 11/30/2010 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
280	QC21- Final Inspection - Work Order Release	0.00				OK	11/01/07		
QC	Memo	0.00							
Quality Control									

MF
11-01-07

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Picklist Print

Wednesday, November 17, 2010 10:27:05 AM

Page 1

Work Order ID: 63863

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft



Start Date: 11/11/2010

Required Date: 11/30/2010

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev: C 05.09.02 Add holes for compatibility with Bell Skidtubes KJ/JLM
IPP Rev: D Added Magnobond, Rubber Cushion & Clamps 07-02-19
JLM

****CHANGE TO CHG 005 - IF USING D2894-1 B35578 OR GREATER****

IPP Rev: E 08-05-22 add comment in seq. 6 and QC15 and QC5 DD verified by: EC

IPP Rev: F 08-06-12 add comment in seq. 24 DD verified by: EC

IPP Rev: G 08-08-19 revE as per dwg DD verified by: EC

IPP Rev: H 09.01.06 ECN 08-562 EC verified by: DD IPP Rev: I

10.04.07 revise route seq. in bom DD verified by: JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D407-667-205TRN

Manufactured

No

B63822

110

Each

0.0000

1

1

DD 10-12-14

Crosstube Turning Detail

AN960JD516

NAS1149D0563J

Purchased

No

230

Each

34.0000

18

18

M114742 11/1/08



Washer

Location

Loc Qty

Loc Code

ST

34

103694

18

107534

12

109287

4

D2856-400

Manufactured

No

230

f

330.2530

1.288

1.355789

ml 11.01.05



Abraison Strip

Location

Loc Qty

Loc Code

ST403

330.2530421

56626

0.00004211

59920

114.253

63735

216

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Parent Item Name: Crosstube Aft

Start Date: 11/17/2010

Required Date: 11/27/2010

Start Qty: 1.00

Required Qty: 1.00

D2873-043

Manufactured No

230 Each

32.0000

2

2



Nut Plate Assembly



ml 11.01.05

Location

Loc Qty

Loc Code

LG

30

62380

10

63497

20

ST

2

60981

2

D2873-045

Manufactured No

230 Each

30.0000

2

2



Nut Plate Assembly



ml 11.01.05

Location

Loc Qty

Loc Code

LG

30

60982

4

62378

6

63498

20

D2894-1

Manufactured No

230 Each

14.0000

1

1



2.750 Support



ml 11.01.04

Location

Loc Qty

Loc Code

LG

14

43713

4

43881

10

D3190-1

Manufactured No

230 Each

26.0000

2

2



Chafing Shield



ml 11.01.05

Location

Loc Qty

Loc Code

LG

26

47456

6

58569

20

W/O:		WORK ORDER CHANGES					
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Required Date: 11/30/2010

Start Qty: 1.00

Required Qty: 1.00

D3595-063-450

Manufactured

No

230

Each

58.9990

2

2



RUBBER CUSHION



11.01.04

63960

Location

Loc Qty

Loc Code

LG

58.99897368

53775

5.97897368

58161

3.56

59580

0.12

61465

29.34

62535

20

MS20601-AD4W8

Purchased

No

230

Each

262.0000

14

14



RIVET



11.01.05

Location

Loc Qty

Loc Code

LG

158

115855

58

116119

100

ST322

104

112203

104

MS21920-22

Purchased

No

230

Each

42.0000

4

4



Clamp(per MIL-DTL-8783C)



11.01.05

Location

Loc Qty

Loc Code

LG

42

114077

42

W/O:		WORK ORDER CHANGES					
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Parent Item Name: Crosstube Afr

Start Date: 11/17/2010

Required Date: 11/29/2010

Start Qty: 1.00

Required Qty: 1.00

MS21920-25

Purchased

No

230

Each

107.0000

2

2



Clamp(per MIL-DTL-8783C)



ml 11-01-04

Location

Loc Qty

Loc Code

LG

83

113281

0

114759

5

114901

3

115278

25

115849

50

ST451

24

113281

5

113282

18

113744

1

AN5-10A

Purchased

No

260

Each

252.0000

10

10



Bolt



11/1/08

Location

Loc Qty

Loc Code

ST337

252

115429

15

115589

100

115700

137

AN5-32A

Purchased

No

260

Each

252.0000

4

4



Bolt



11/1/08

Location

Loc Qty

Loc Code

ST340

252

114405

42

115016

50

115108

50

115589

60

115698

50

Wednesday, November 17, 2010 10:27:05 AM

Shop Packet Print

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Required Date: 11/30/2010

Start Qty: 1.00

Required Qty: 1.00

AN5-34A

Purchased

No

~~200~~ Each

68.0000

4

4

Bolt

Location

Loc Qty

Loc Code

ST340

68

113149

2

113226

26

115835

20

116003

20

MS21042L5

Purchased

No

~~200~~ Each

1,373.000

4

4

Nut

Location

Loc Qty

Loc Code

ST139

26

114813

26

ST300

1347

115156

147

115594

500

116104

200

116105

500

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

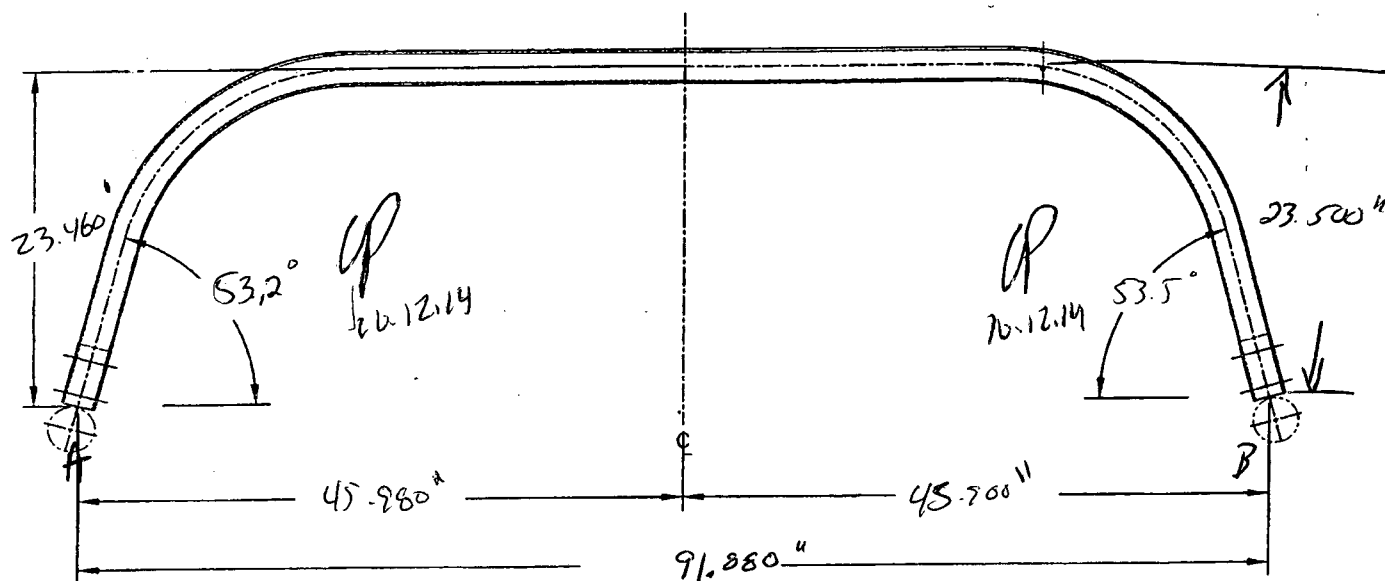
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	63863
Description: Crosstube High Aft (407)	Part Number:	D407-667-205
Inspection Dwg: D407-667-245	Rev: F	Page 1 of 1

Required Dimension	Min	Max
Height	23.46	23.58
1/2 Span	45.86	45.98
Angle	54	56
Total Span	91.72	91.96



Comments
ANGLES UNDER TOL., ACCEPTABLE CP 10.12.14
QSI 10/12/14

QC15 Inspection	<i>[Signature]</i>
Date	10/10/14

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.06.22	Dwg Rev updated	KJ	<i>[Signature]</i>

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	QT. -245	PART NUMBER	DESCRIPTION
1	X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
2	1	D6011-115	CROSSTUBE
3	2	D2856-400-773	ABRASION STRIP
4	2	D2873-043	NUT PLATE
5	2	D2873-045	NUT PLATE
6	1	D2894-1	SUPPORT
7	2	D3190-1	CHAFING SHIELD
8	2	D3595-063-430	RUBBER CUSHION
9	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
10	4	MS21920-22	CLAMP
11	2	MS21920-25	CLAMP (OR MS21920-24)
12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947- 100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6011-115
FINISHED LENGTH = 112.91±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-245" AND BATCH NUMBER ON
INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 27.7 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND
6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO
PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS WITH D3595-063-430 RUBBER CUSHIONS TO SECURE D2894-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE
SUPPORT.
NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS.
ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF
CROSSTUBE, PER QSI 035.
- 16) INSTALL D3190-1 CHAFING SHIELDS SO THAT OVERLAP IS ON BOTTOM SIDE OF CROSSTUBE
OPPOSITE D2894-1 SUPPORT.
- 17) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN
SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 63863
BS10-11-17

RELEASED
08/11/12

F	REFORMAT NOTES TO NEW STANDARDS (ZN B8-1); RELOCATED FLAG # 6 (ZN A8-3) PER NCR 210; REMOVED REF. & ADD TOLERANCES (ZN C8-3, C4-3 & D2-3)	RF	08.11.06
E	8.02 AND 8.53 WERE 8.40 AND 8.90 (ZN D5-2); REORGANIZED VIEWS AND REFORMATED DRAWING TO CURRENT STANDARDS. REASONS: CLAMPS MOVED 0.375 TOWARD CL TO ELIMINATE INTERFERENCE WITH AIRCRAFT MOUNTS. REFERENCE: PAR#08-21 AND ECN#1225	MB	08.07.24
D	ADD VIEW FOR OEM SKID HOLES, ROTATE ORIENTATION OF CLAMPS SECTION F-F, REMOVE -851 ABRASION STRIP, ADD MAGNOBOND 6398, ADD CUSHION	PH	07.02.07
C	ADD HOLES AND NUT PLATES FOR COMPATIBILITY WITH BHT/AA SKIDTUBES	PH	05.07.26
B	ADD CHAFING SHIELD	CP	03.05.21
A	NEW ISSUE	CP	02.05.13
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN	RF		
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	08.11.06		

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. REV. F
D407-667-245 SHEET 1 OF 4
TITLE SCALE
CROSSTUBE ASS'Y (407 HIGH AFT) NTS

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

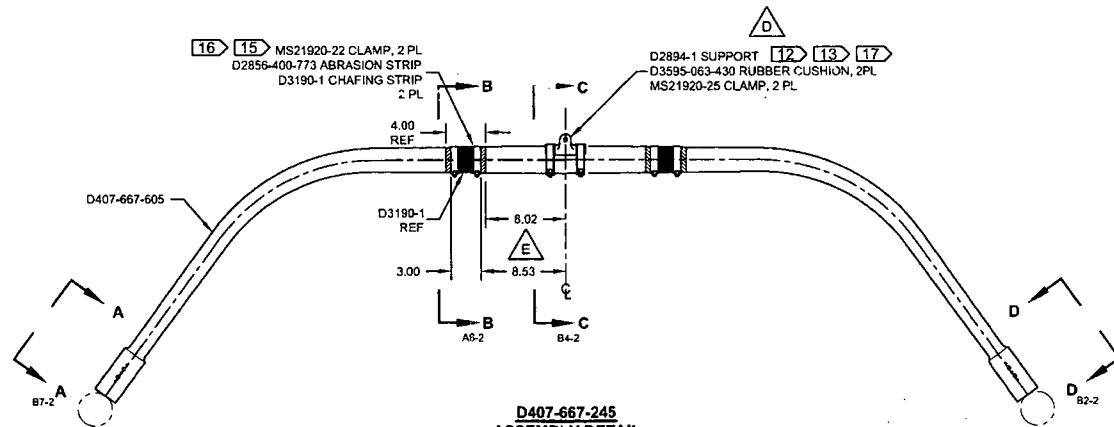
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Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

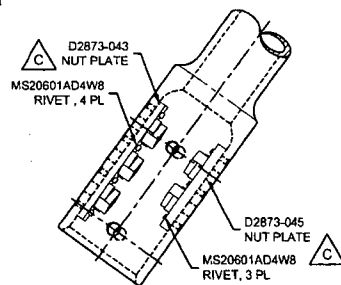
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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

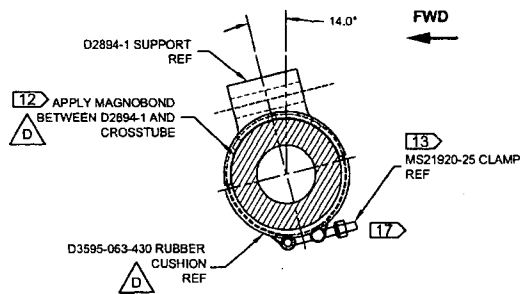
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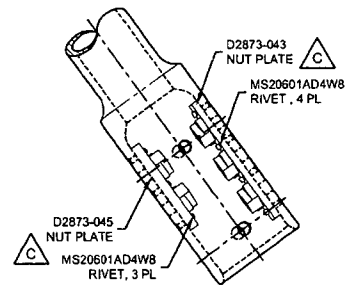
D407-667-245
ASSEMBLY DETAIL
(VIEW LOOKING FWD)



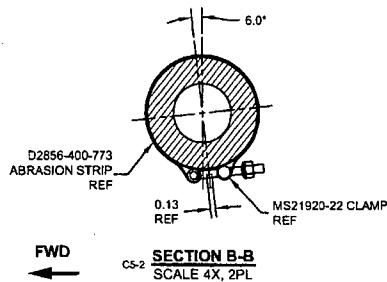
VIEW A-A CUFF DETAIL
SCALE 4X



SECTION C-C
SCALE 4X



VIEW D-D CUFF DETAIL
SCALE 4X



SECTION B-B
SCALE 4X, 2 PL

RELEASED
08/11/06

DESIGN	40	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RE		
CHECKED	40	DRAWING NO.	REV. F
MFG. APPR.	40	D407-667-245	SHEET 2 OF 4
APPROVED	40	TITLE	SCALE
DE APPR.	40	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

8 7 6 5 4 3 2 1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

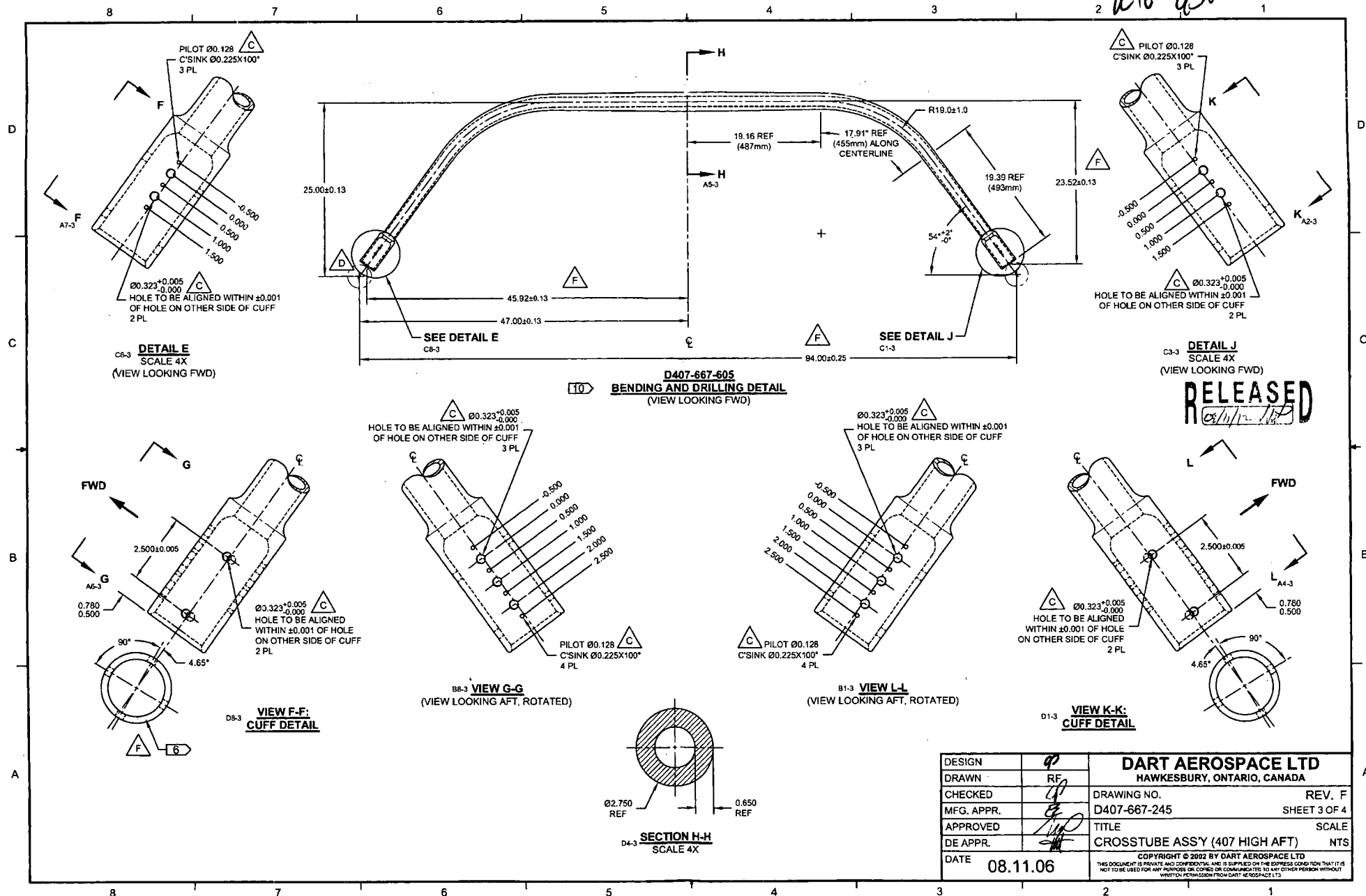
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Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

2 u6 43863



DESIGN	9	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9	DRAWING NO.	REV.
MFG. APPR.	9	D407-667-245	SHEET 3 OF
APPROVED	9	TITLE	SCALE
DE APPR.	9	CROSSTUBE ASSY (407 HIGH AFT)	NT
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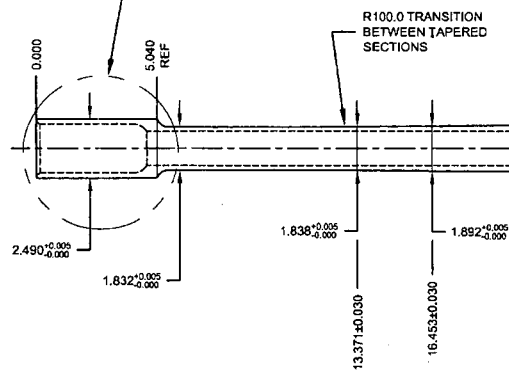
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Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

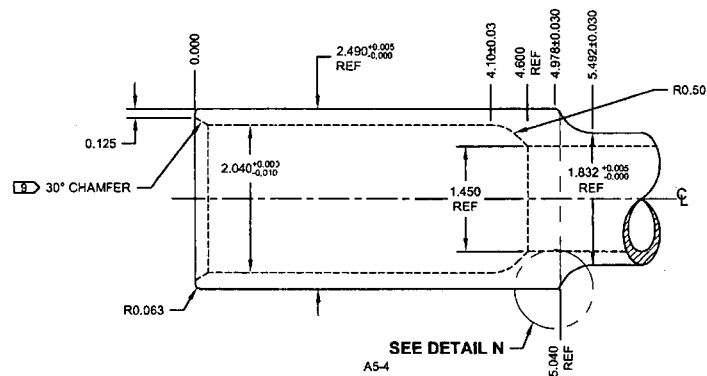
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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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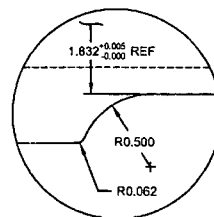
SEE DETAIL M
A7-4



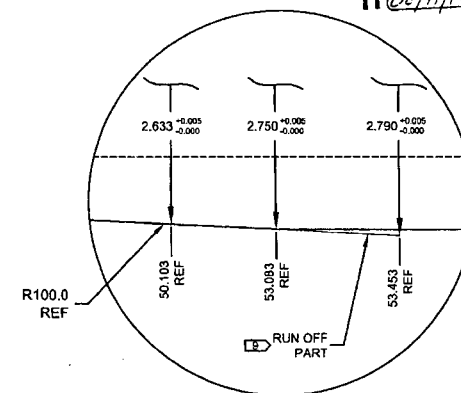
D407-667-245 MACHINING DETAIL



DETAIL M: CROSSTUBE CUFF
SCALE 3X



DETAIL N: CUFF TRANSITION
SCALE 2X



DETAIL P: TAPER RUN-OFF
NOT TO SCALE

RELEASED
08/11/12

DESIGN	0	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	0	DRAWING NO.	REV. F
MFG. APPR.	0	D407-667-245	SHEET 4 OF 4
APPROVED	0	TITLE	SCALE
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NOTE: Date & initial all entries



LIQUID PENETRANT TEST REPORT

P- 15200

PAGE 1 OF 1

CLIENT DART AEROSPACE DATE DEC-21-2010 TIME AM ☒ PM ☐
ATTENTION LINDA LACELLE ACUREN JOB NO. 188-10-0971
ADDRESS 1270 ABEL DEEN PO/VO NO. 13181
HAWKESBURY, ONT. WORK LOCATION HAWKESBURY PLANT
ACCEPTANCE STD. ASTM 1417 REV./DATE 2005
PROJECT FPI ON CROSS TUBES
ITEM(S) EXAMINED 4 UNITS

JOB DESCRIPTION PROCEDURE NO. LT0002 REV./DATE 2008 TECHNIQUE NO. LT0002 REV./DATE 2008
PART NO. — MATERIAL ALUMINUM THICKNESS VARIOUS
SCOPE A WET FLOUORESCENT LIQUID PENETRANT EXAMINATION.
WAS COMPLETED 100% EXTERNAL.

TEST DETAILS
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND MAGNAFLUX BLACK LIGHT S/N 16459 ☐ OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
PENETRANT 2LG7 MINIMUM DWELL TIME 450 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER LABINO
DEVELOPER SKD 52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE 06-19-2011
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- ☐ METRIC ☐ IMPERIAL

1	CROSSTUBE-W.O. 63862	✓
1	CROSSTUBE-W.O. 63863	✓
1	CROSSTUBE-W.O. 63986	✓
1	CROSSTUBE-W.O. 63985	✓

10-12-21

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES
CLIENT REPRESENTATIVE Jan Titley DTR # E 63236
TECHNICIAN (SIGNATURE): Mike Johnston REPORT REVIEWED BY:
NAME (PRINT): Mike Johnston NAME INITIALS
1ST TECHNICIAN 2ND TECHNICIAN
CGSB LEVEL II SNT LEVEL — CGSB LEVEL — SNT LEVEL —
CGSB REG. No 6606 CGSB REG. No —

5.0 PARTS LIST

Item	Qty -011	Qty -013	Qty -015	Qty -101	Qty -201	Qty -103	Qty -203	Qty -105	Qty -205	Part Number	Description
	X									D206-667-011	SPACER BLOCK KIT
		X								D206-667-013	NUT PLATE KIT (-101/-103/-105/-203/-205)
			X							D206-667-015	NUT PLATE KIT (-201)
				X						D206-667-101	CROSSTUBE INSTALLATION, 206A/B HIGH FWD
					X					D206-667-201	CROSSTUBE INSTALLATION, 206A/B HIGH AFT
						X				D206-667-103	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH FWD
							X			D206-667-203	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH AFT
								X		D407-667-105	CROSSTUBE INSTALLATION, 407 HIGH FWD
									X	D407-667-205	CROSSTUBE INSTALLATION, 407 HIGH AFT
1				1						D206-667-141	CROSSTUBE ASSEMBLY, 206A/B HIGH FWD
2					1					D206-667-241	CROSSTUBE ASSEMBLY, 206A/B HIGH AFT
3						1				D206-667-143	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH FWD
4							1			D206-667-243	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH AFT
5								1		D407-667-145	CROSSTUBE ASSEMBLY, 407 HIGH FWD
6									1	D407-667-245	CROSSTUBE ASSEMBLY, 407 HIGH AFT
10				*2	*2	*2		*2		D2891-1	SUPPORT
11							*2			D2892-1	SUPPORT
12									*1	D2894-1	SUPPORT
13				*2	*2	*2		*2		D2856-400-694	ABRASION STRIP
14							*2		*2	D2856-400-773	ABRASION STRIP
15									*1	D2856-600-851	ABRASION STRIP
16				*4	*4	*4		*4		MS21920-20	CLAMP
17							*4		*4	MS21920-22	CLAMP
18									*2	MS21920-24	CLAMP
19				4	4	4		4		AN5-32A	BOLT
20							4		*4	AN5-34A	BOLT
21				4	4	4	4	4	4	MS21042L5	NUT (OR MS21042-5)
22				8	8	8	8	8	8	AN960JD516	WASHER
23									*2	D3190-1	CHAFING SHIELD
30	8									AN4-6A	BOLT
31	8									AN4-7A	BOLT
32	16									AN960JD416	WASHER
33	2									D3193-041	SPACER BLOCK ASSEMBLY
40		2		*2		*2	*2	*2	*2	D2873-043	NUT PLATE
41		2		*2		*2	*2	*2	*2	D2873-045	NUT PLATE
42			2		2					D2872-043	NUT PLATE
43			2		2					D2872-045	NUT PLATE
44		10		10		10				AN5-7A	BOLT
45		10	10		10		10	10	10	AN5-10A	BOLT
46		4	4	4	10	4		4		AN5-30A	BOLT
47		4					4		4	AN5-32A	BOLT
48		18	18	10	12	10	10	10	10	AN960JD516	WASHER
49		4	4		6					MS21042L5	NUT (OR MS21042-5)

*REFERENCE ONLY. PARTS ARE INCLUDED IN D206-667-141/241/143/243, & D407-667-145/245 ASSEMBLIES ABOVE

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Revision: C

Date: 05.07.26

Work Order ID 63863

Wednesday, November 17, 2010 10:27:01 A

Item ID: D407-667-205

Revision ID:

Item Name: Crosstube Aft

Start Date: 11/17/2010 Start Qty: 1.00

Required Date: 11/30/2010 Req'd Qty: 1.00

Reference:

Approvals: Process Plan: *MA*

QC:

Date: 10-11-17

Date:

Tooling:

SPC (Y/N):

Cust Item ID:

Customer:

Setup Start

Stop

Run Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

Draw Nbr

Revision Nbr

D407-667-245

Rev F

0.00

100



DC

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile and create labels as per PPP D407-667-205 CHG006

0.00

110



Packaging

Packaging

Pick Kit

Packaging

Memo

0.00

0.00

120



CNC Bend 1

CNC Delta 100 Bender

BENDING MACHINE - CROSSTUBES

Memo

1-Bend tube as per Dwg D407-667-245 using CNC bender program 407 Aft and Folio FT

0.00

0.00

*R 11-01-10**DP**10-12-14**DP**10-12-14*